UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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ART UNIT	PAPER NUMBER
2122	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/854,458	KYUSHIMA ET AL.
	Examiner	Art Unit	
	Mary J. Steelman	2122	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>20 May 2004</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-10* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____ .

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____ .

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____ .

DETAILED ACTION

1.   This Office Action is in response to Amendment A filed 20 May 2004. Claims 1, 6, and

8-10 are amended. Claims 7 and 11 are canceled. Claims 1-6 & 8-10 are pending.

Drawings

2.   In view of the amended Specification, the prior Drawing objection is hereby withdrawn.

Claim Objections

3.   In view of the amendment to Claim 8, the prior claim objection is hereby withdrawn.

Claim Rejections - 35 USC § 101

4.   In view of the amendments to claims 6 and 10, the prior 35 U.S.C. 101 rejections are

hereby withdrawn.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

6.   Claims 1, 8, and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the written description requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant

art that the inventor(s), at the time the application was filed, had possession of the claimed

invention. The term "one-time compile method" recited in amended claims 1, 8, and 10 lack

support in the Specification and thus are considered new matter.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 1-6 & 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US

Patent 6,462,579 to McKinsey, in view of US Patent 6,631,518 to Bortnikov et al.

Per claim 1, McKinsey disclosed:

-A...method (Abstract: "...method of compiling...")

(a) generating first object codes using said speculation mechanism from a repetitively executed

fragment of a source program; (Col. 2, lines 60-66, "...compiling source code...generates object

code...inserting a speculation check into object code instructions (generates object code using

speculation)...")

(b) generating second object codes not using said speculation mechanism from said repetitively

executed fragment of said source program; (Col. 2, lines 65-66, "...storing recovery code

associated with the speculation check..." and col. 4, lines 33-35, "The compiler...provides a

recoverable interval of instructions (not using speculation) for the machine to execute in the case

of failed speculation..." McKinsey generates object code to use when the speculation object

code is not used.)

(c) generating third object codes that perform a control transfer; (Col. 4, lines 50-52, "Explicit

recovery code changes the control flow (control transfer) of the optimized program. Speculating

a load then implies that control flow should be add to place the recovery code." McKinsey

generated code to switch between the two types of generated object code, speculation code or non-speculation code.)

McKinsey failed to disclose a decision based on a rule of "a number of times" a speculation failure is detected by said speculative check instruction during execution of said first object codes satisfies a predetermined condition, said second object codes for said repetitively executed program fragment are executed."

However, Bortnikov disclosed profiling data for each compiled procedure. At col. 2, lines 46-53, "...organizer profile information...benchmarking phase and then, during the optimization phase, provides a system for identifying and utilizing valid profile information..." At col. 4, lines 32-33, Bortnikov disclosed "counters to be updated, accumulating branch decisions." And at col. 6, lines 34-39, "the compiler can make optimization decisions such as...when to allow early speculative execution of instructions..."

Therefore, it would have been obvious, to one of ordinary skill in the art at the time of the invention, to have included profile data as described in Bortnikov's invention to modify McKinsey's invention, because both inventions compile source code into variations of object code, Bortnikov additionally considers data retrieved from profiling when making a decision as to which code version to execute. Using profiling data to make informed decisions is well known in the art.

Per claim 2:

-predetermined condition in said step (c) is that the number of times a speculation failure is detected exceeds a predetermined value. (McKinsey: Col. 4, lines 58-61 and col. 6, lines 34-39.)

Per claim 3:

-predetermined condition is said step (c) is that a ratio of the number of times a speculation failure is detected by the speculation check to a number of times the repetitively executed program fragment is executed exceeds a predetermined value. (McKinsey: Col. 4, lines 58-61 and col. 6, lines 34-39.)

Per claim 4:

-when a speculation failure is detected by the speculation check, a value of counter is incremented and when the counter value exceeds a predetermined value, said third object codes transfer control to execution of said second object codes. (McKinsey: Col. 4, lines 58-61 and col. 6, lines 34-39.)

Per claim 5:

-once said speculation failure is detected, said third object codes transfer control to execution of said second object codes. (McKinsey, col. 4, lines 33-35, "The compiler of system 10 provides a recoverable interval of instructions for the machine to execute in the case of failed speculation.")

Per claim 6:

-a compiler program, tangibly stored on a computer readable medium, using said compile

method according to claim 1. (McKinsey: See fig. 1 and col. 4, line 4, "compiler system 10".)

Per claim 8:

-A…method / A computer for generating an object program… / An object program, tangibly

embodied on a storage medium…

(Abstract: "A system and method…", col. 14, lines 16-47, "A computer-readable medium…"

-generating first object codes from said source program by using a speculative instruction and a

speculative check instruction for checking a speculation failure; (Col. 2, lines 60-66,

"…compiling source code…generates object code…inserting a speculation check into object

code instructions (object code using speculation)…")

-generating second object codes from said source program without using said speculative

instruction and said speculative check instruction; (Col. 2, lines 65-66, "…storing recovery code

associated with the speculation check…" and col. 4, lines 33-35, "The compiler…provides a

recoverable interval of instructions (not using speculation) for the machine to execute in the case

of failed speculation…")

-generating third object codes that perform control to first execute said first object codes; (Col.

7, line 66-col. 8, line 3, "…recovery use instructions are never scheduled explicitly. That is, the

candidate selection mechanism never picks these to be scheduled. They are scheduled merely as

a side effect of scheduling a recovery check instruction." In other words, the speculation code is

executed first, with control switching to the non-speculation code upon failure.)

-generating fifth object codes that perform control to execute said second object codes (Col. 4, lines 50-52, "Explicit recovery code changes the control flow (control transfer) of the optimized program. Speculating a load then implies that control flow should be add to place the recovery code (execute non-speculative code).")

McKinsey failed to disclose a decision based on a rule of "a number of times" a speculation failure is detected by said speculative check instruction during execution of said first object codes satisfies a predetermined condition, said second object codes for said repetitively executed program fragment are executed."

However, Bortnikov disclosed profiling data for each compiled procedure. At col. 2, lines 46-53, "...organizer profile information...benchmarking phase and then, during the optimization phase, provides a system for identifying and utilizing valid profile information..." At col. 4, lines 32-33, Bortnikov disclosed "counters to be updated, accumulating branch decisions."

Therefore, it would have been obvious, to one of ordinary skill in the art at the time of the invention, to have included profile data as described in Bortnikov's invention to modify McKinsey's invention, because both inventions compile source code into variations of object code, Bortnikov additionally considers data retrieved from profiling when making a decision as to which code version to execute. Using profiling data to make informed decisions is well known in the art.

Per claim 9:

(See rejection of claim 8 above.)

-a memory device to store said source program; a central processing unit (CPU) to execute a

compiler program for generating said object program from said source program; a display device

to output a result of compile processing executed by said CPU; a bus to connect said memory

device, said CPU and said display device; (McKinsey: See Fig. 1 and col. 4, lines 5-16,

"...processor 12...connected (bus) to memory 16...display screen (line 15))

-generating first object codes from said source program by using a speculative instruction and a

speculative check instruction for checking a speculation failure; (Col. 2, lines 60-66.)

-generating second object codes from said source program without using said speculative

instruction and said speculative check instruction; (Col. 2, lines 65-66 and col. 4, lines 33-35.)

-generating third object codes that perform control to first execute said first object codes; (Col.

7, line 66- col. 8, line 3.)

-generating fifth object codes that perform control to execute said second object codes after the

number of times reaches a predetermined value. (Col. 4, lines 50-52.)

McKinsey failed to disclose a decision based on a rule of "a number of times" a

speculation failure is detected by said speculative check instruction during execution of said first

object codes satisfies a predetermined condition, said second object codes for said repetitively

executed program fragment are executed."

However, Bortnikov disclosed profiling data for each compiled procedure. At col. 2, lines 46-53, "...organizer profile information...benchmarking phase and then, during the optimization phase, provides a system for identifying and utilizing valid profile information..." At col. 4, lines 32-33, Bortnikov disclosed "counters to be updated, accumulating branch decisions."

Therefore, it would have been obvious, to one of ordinary skill in the art at the time of the invention, to have included profile data as described in Bortnikov's invention to modify McKinsey's invention, because both inventions compile source code into variations of object code, Bortnikov additionally considers data retrieved from profiling when making a decision as to which code version to execute. Using profiling data to make informed decisions is well known in the art.

Per claim 10:

(See rejection of claim 8 above.)

-An object program, tangibly embodied on a storage medium... (Col. 14, lines 16-47.)

-a first object code portion generated from said source program by using a speculative instruction and a speculative check instruction for checking a speculation failure; (Col. 2, lines 60-66.)

-a second object code portion generated from said source program without using said speculative instruction and said speculative check instruction; (Col. 2, lines 65-66 and col. 4, lines 33-35.)

-a third object code portion that performs control to first execute said first object code portion;

(Col. 7, line 66- col. 8, line 3.)

-a fifth object code portion that performs control to execute said second object code portion after

the number of times reaches a predetermined value. (Col. 4, lines 50-52.)

McKinsey failed to disclose a decision based on a rule of "a number of times" a

speculation failure is detected by said speculative check instruction during execution of said first

object codes satisfies a predetermined condition, said second object codes for said repetitively

executed program fragment are executed."

However, Bortnikov disclosed profiling data for each compiled procedure. At col. 2,

lines 46-53., "...organizer profile information...benchmarking phase and then, during the

optimization phase, provides a system for identifying and utilizing valid profile information..."

At col. 4, lines 32-33, Bortnikov disclosed "counters to be updated, accumulating branch

decisions."

Therefore, it would have been obvious, to one of ordinary skill in the art at the time of the

invention, to have included profile data as described in Bortnikov's invention to modify

McKinsey's invention, because both inventions compile source code into variations of object

code, Bortnikov additionally considers data retrieved from profiling when making a decision as

to which code version to execute. Using profiling data to make informed decisions is well

known in the art.

Response to Arguments

9.   Applicant's arguments filed 20 May 2004 have been fully considered but they are not

persuasive.

(A) Applicant has argued, in substance, the following:

As Applicant has pointed out on page 12, 3rd paragraph, of Amendment A, dated 20 May 2004,

"...neither McKinsey nor Bortnikov et al., taken alone or in any proper combination, disclose,

suggest or render obvious the limitations in the combination of each of these claims of, inter alia,

a one time compile in a computer that includes generating second object codes not using a

speculation mechanism from a repetitively executed fragment of a source program, or generating

third object codes that perform a control transfer so that after a number of times of speculation

failure is detected by a speculation check instruction during execution of the first object codes

satisfies a predetermined condition, the second object codes for the repetitively executed

program fragment are executed."

Examiner's Response:

See rejection of claim 1 above. McKinsey does provide for "generating first object codes using

said speculation...", "generating second object codes not using said speculation (recovery

code)..., and "generating third object codes that perform a control transfer..." that are used if

recovery code is to be executed. See "SUMMARY OF THE INVENTION", col. 2, line 58 – col.

3, lines 6. The Bortnikov reference is used to provide rejection for detecting a number of times a

speculation fails. Bortnikov disclosed utilizing profile information, including counters for

branch decisions (col. 4, lines 32-33) to decide when to allow early speculation (col. 6, lines 34-

30. Bortnikov did disclose (col. 4, lines 54-61), "Various methods of optimizing program code

with profile data…", whereby various phases are performed, including an optimization phase

where the program is recompiled and optimized in light of the profile information. The instant

application refers to phases of compilation. The instant application is silent regarding whether or

not recompilation occurs. Thus, the added limitation, "one-time compile method", is treated by

Examiner as new matter.

Examiner maintains the rejections of claims 1-6 & 8-10.

Conclusion

10.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

11.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

12.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Mary Steelman, whose telephone number is (703) 305-4564. The
examiner can normally be reached Monday through Thursday, from 7:00 A.M. to 5:30 P.M.   If
attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan
Dam can be reached on (703) 305-4552.

        The fax phone number is (703) 872-9306 for regular communications and for After Final
communications. Any inquiry of a general nature or relating to the status of this application or
proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Mary Steelman

29 July 2004

TUAN DAM
SUPERVISORY PATENT EXAMINER